West Virginia University Libraries
3 0802 100896129 9

Digitized by the Internet Archive
in 2010 with funding from
Lyrasis Members and Sloan Foundation

http://www.archive.org/details/turkeybreederflo407clar

TURKEY BREEDER FLOCK MANAGEMENT

AND

ARTIFICIAL INSEMINATION

By

T. B. Clark

BULLETIN 407 JUNE, 1957

WEST VIRGINIA UNIVERSITY AGRICULTURAL EXPERIMENT STATION

AUTHOR

T. B. Clark is Associate Poultry Husbandman in the West Virginia Agricultural Experiment Station, and Associate Professor of Poultry Husbandry in the College of Agriculture, Forestry, and Home Economics.

West Virginia University
Agricultural Experiment Station
College of Agriculture, Forestry, and Home Economics
H. R. Varney, Director
Morgantown

Turkey Breeder Flock Management and Artificial Insemination

T. B. CLARK*

Introduction

LOW fertility is perhaps the most common, most costly problem in turkey breeding flocks. A study reported in Oregon Agricultural Experiment Station Bulletin 524 (1952) showed that fertility of hatching eggs proved to be one of the most important factors affecting net returns. It was found, also, that the seasonal decline in hatchability of eggs set followed very closely the seasonal decline in fertility. This same study indicated that use of lighter toms of the Broad Breasted Bronze variety increased fertility.

The turkey industry in West Virginia is dependent on a supply of high-quality hatching eggs to furnish day-old poults. Flock owners in this area are facing high feed prices and labor costs. To meet competition they must produce efficiently. To do this the turkey breeder flocks must be managed so as to produce eggs with 85 per cent or better fertility to insure hatching a high percentage of poults.

Size of the breeder flock is important. The Oregon study suggested that medium-sized flocks—400 to 700 hens—were the most economical. Labor efficiency increased rapidly when the flocks increased from 100 to 700 hens. Beyond this size there was little gain in efficiency. Not only were the medium-sized flocks the most efficient, but the average return to the operator was greater because the fertility was better than for the larger flocks. Medium-sized flocks should also be the most efficient, under West Virginia conditions.

The all-mash system will take the guess work out of feeding the turkey breeder flock. With this system and a good mash the nutritional requirements for good hatchability are met for each turkey. The all-mash system saves labor and, if the feed is pelleted, loss from wastage and wind is reduced. If the mash and grain system of feeding is used, it is necessary to follow the manufacturer's directions.

* The author was assisted by R. E. Cook, formerly Research Assistant in Poultry Husbandry, in obtaining the experimental results presented here.

Controlling Disease

Diseases always reduce fertility and hatchability. Management can play a big role in prevention—and disease prevention is easier than any treatment. The one disease that can be prevented around the turkey farm is fowlpox. Fowlpox vaccination during the growing period, in July or August, is usually sufficient.

Blackhead is not always a problem in breeder flocks, but it is necessary to use uncontaminated yards or ranges during the breeding season to avoid the disease. If the turkeys are not confined, it is advisable to feed a drug continuously in the mash for the prevention of this disease during the breeding season if there had been any loss from blackhead in the flock during the growing period.

Well-grassed and well-drained pastures that have not been used by turkeys or chickens for two or more years are necessary for best results. For sanitary reasons and to retain the pasture crop, two yards should be set up and the breeding flock rotated between the yards several times during the season. Allow about 200 square feet of range per breeder. To further reduce contamination and to keep a good heavy covering of grass, the yards should be used only during the breeding season.

Muddy ranges generally lead to trouble. In fact, "mud-fever" was so named because it was first recognized on muddy ranges in the state of Washington. This disease, similar to "blue comb," responds to antibiotics.

If a well-drained and uncontaminated range is not available, the flock owner should consider keeping the flock in complete confinement. Housing the breeder flock is a fairly simple matter. In this climate expensive houses are not required, for some protection from wind is all that is necessary.

Pole sheds are the cheapest type of shelter for the breeder flock held in complete confinement. Openings should be provided for plenty of cross ventilation in warm weather, but doors should be available to close the openings and stop the cold winds. Good results will be obtained under such conditions provided there is ample feeding, watering, and floor space. All turkeys should be able to eat at one time to prevent "boss-ism." Allow at least 12 square feet of floor space per small-type breeder turkey and 15 square feet per large-type breeder turkey.

Confinement of turkeys to sunporches with wire or slat floors has not proved satisfactory at West Virginia University as permitting them

access to clean range. The slat and wire floors discourage mating, resulting in low fertility. Confinement to sunporches is better, however, than giving the breeders access to contaminated range or to range that exposes them to predatory animals. The low fertility can be corrected by artificial insemination.

Turkey bits or moderate debeaking of the hens in complete confinement are usually necessary to prevent picking and injury to toms.

Correct Amount of Artificial Light is Important

Artificial lighting must be used to obtain early or out-of-season eggs, especially when the flock is confined. For this purpose a 14-hour light day should be provided for the breeding flock during winter and early spring months. Proper lighting is necessary because toms apparently can be over-stimulated by too much light, resulting in an early molt, followed by lowered fertility.

Bronze and other large-type toms should be at least 8 months old and Beltsville toms 7 months of age when mated. It is well for toms and hens to be about the same age at the start of the breeding season. Late-hatched toms held without lights can be used during the last half of the breeding season.

Lights should shine evenly over the roosting area and, according to Marsden and Martin (1955), should provide 1.7 to 2.5 foot-candles of intensity at roosting bird height with the lights 6½ feet above the roosts. When the distribution is uniform these authors suggested that 40-watt bulbs with shades, 10 feet apart each way, will give the necessary foot candles. However, it is best to read the actual intensity with a light meter.

Lighting toms, the same as that practiced for hens, about 3 weeks ahead of the hens is a common practice. It takes about 4 weeks to stimulate egg production and the lights on the toms should be started about 7 weeks before saving eggs to set. Continue the lights until about April 15.

The tom-hen ratio and the management of the toms are very important factors for good fertility. For large flocks of Broad Breasted Bronze, 12 toms to 100 hens is a good ratio, although some variation will have little effect. It is now common practice to keep half the toms with the hens and rotate them every two weeks. This rotation of toms among pens of hens has been found to increase fertility. Lights must

be used on the toms in the resting pens the same as when they are in use. The reserve pen of young toms, for use after April 15, should not be lighted at any time.

Some now think there is a genetic basis for fertility. This is being studied in pedigree matings at West Virginia University. There are differences between strains in both fertility and hatchability but to select for improvement is difficult. Without the use of trapnests one can only choose well-balanced, up-standing toms with a natural gait. In the large varieties toms should be about 28 weeks of age when selection is made and be of medium weight—say, less than 30 pounds.

Low fertility may arise from some management factors such as immature toms, lack of pre-season lighting for early eggs, and exceeding the tom-hen ratio of 1 to 8. Environmental stresses such as slat floors and extreme temperatures seem to depress fertility in the Broad Breasted Bronze.

Artificial Insemination

Artificial insemination is becoming popular where low fertility is a problem. It reduces the number of toms required and does away with saddles. Kansas workers (1956) found that long saddles may decrease fertility. A number of workers have found that a new version of the method—a combination of natural mating and artificial insemination—gives better results than either method alone. This supplementary method has been studied at West Virginia University by Clark and Cook (1955) and will be discussed here.

Some turkey breeder flock owners consider the technique too expensive and the turkey too small an animal on which to practice artificial insemination. Considering the price of turkey eggs, low fertility in the Broad Breasted Bronze variety is more expensive than the cost of artificial insemination.

The technique of artificial insemination can be acquired after watching an experienced operator. Experience will be gained while checking the toms saved for breeders for good semen production. There are always many low producers and a few non-producers of semen which must be discarded.

Collecting the Semen

Medium-weight Broad Breasted Bronze toms at least 8 months of age given a 14-hour light day in mid-winter, two weeks before they are used give best results. A preliminary "milking" test will indicate the poor

semen producers. The toms should be "rehearsed" every other day until they respond readily. Some toms yield 0.3 to 0.4 cubic centimeters at each collection, but 0.25 cc. is about average. This is sufficient for 6 to 10 hens when 0.025 cc. is injected into each hen. The hens should be inseminated every 2 weeks for best results. Inseminate not more than 30 minutes after collecting semen.

The equipment required is simple. A 1 cc. glass tuberculin syringe, graduated in 1/100 cc., a whiskey "jigger," and one or two small test tubes or glass bottles constitute the necessary equipment. In our experimental work we transfer the semen to small test tubes and keep it warm in a short soup-type thermos bottle. A block with holes in it holds the vials or test tubes until they are needed.

Two operators working together are necessary for both collecting semen and inseminating hens. There are several methods for holding the toms. Whichever is used, the tom must not be frightened because this leads to tension and the tom cannot be stimulated. One operator sits on a chair and the tom is placed across his knees. The other operator holds the two legs loosely in one hand and the whiskey "jigger" or glass vial in the other. The first operator strokes the saddle feathers in front of the tail with the left hand, and massages the soft part of the abdomen under the vent with thumb and fingers of the right hand.

When the tom responds by protruding the sex organs, the operator holds the tail back with his left hand and also uses this hand to "milk" semen from the organ. The semen is thick and creamy white. The glass receptacle is kept handy by the second operator and he can catch the semen, or the first operator can take the glass and hold it under the protruded organ. If feces contaminate the semen, it should be discarded, —urates, the white colored discharge, do not appear to affect the quality of the semen.

In our experimental work we found that high yielding toms do not need to be removed from the flock and penned up separately from the hens 24 hours ahead. We found after they become conditioned to "milking" that good semen producers can be picked and "milked" almost any time while running with the hens.

Inseminating Hens

Inseminating the hens is easier than "milking" the toms. This part of the operation is best done in early morning or late afternoon so that a hard-shelled egg is not too close to the vent. Hens should not be inseminated when they are holding a hard-shelled egg.

One operator in a kneeling or sitting position holds the hen's hea between his knees. Pressure is exerted on the abdomen with the righ hand to expose the opening and force the oviduct out. The oviduct is t the left of the cloaca. The left hand is used to force the tail back. Th second operator fills the syringe with the proper quantity of semen an inserts it at least 1 inch into the oviduct. The pressure on the abdome is released and then the plunger is pushed to deliver 0.025 to 0.05 cc. c semen. The tail is pressed back into normal position and the hen gentl released to keep her from discharging the semen.

The oviduct can be everted with little difficulty if the hen is in fu laying condition, but even if she is not in full lay, it can still be force out but with considerable pressure. If the oviduct is not active, it cann be forced out.

In this trial the breeding flock was maintained on slat floors. T test the technique on slat floors 6 of the 12 hens in each of the 8 pen with single-tom matings were artificially inseminated at the start of th season and every 2 weeks thereafter. The other 6 hens in each pen wer allowed to mate naturally.

Average Fertility Improved

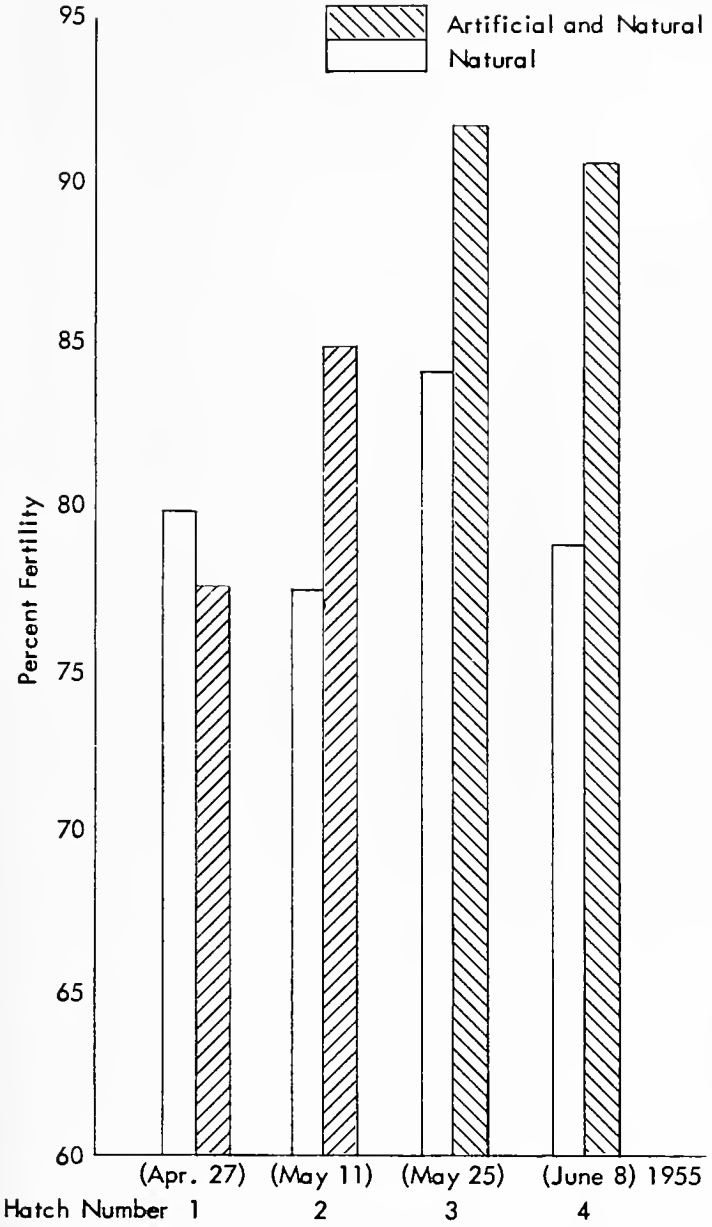
The average percentage of fertility for each group for each hatch i shown in Graph 1. Even though the fertility did not drop very low in th hens naturally mated, the artificially mated hens exceeded them in th percentage of fertile eggs produced after the first hatch. High fertilit was maintained through the other three hatches when a seasonal dro would be expected as shown by the lower line. In the June hatch th eggs from the artificially mated hens were 90 percent fertile or 14.7 per cent above those from the natural matings. These differences occurre even though both groups of hens were running with the tom in each per

The fertility was not improved in all pens. Several hens in two pen had a low fertility all season. This was not improved by artificial in semination. The results show that the artificial method was effective i increasing the average fertility.

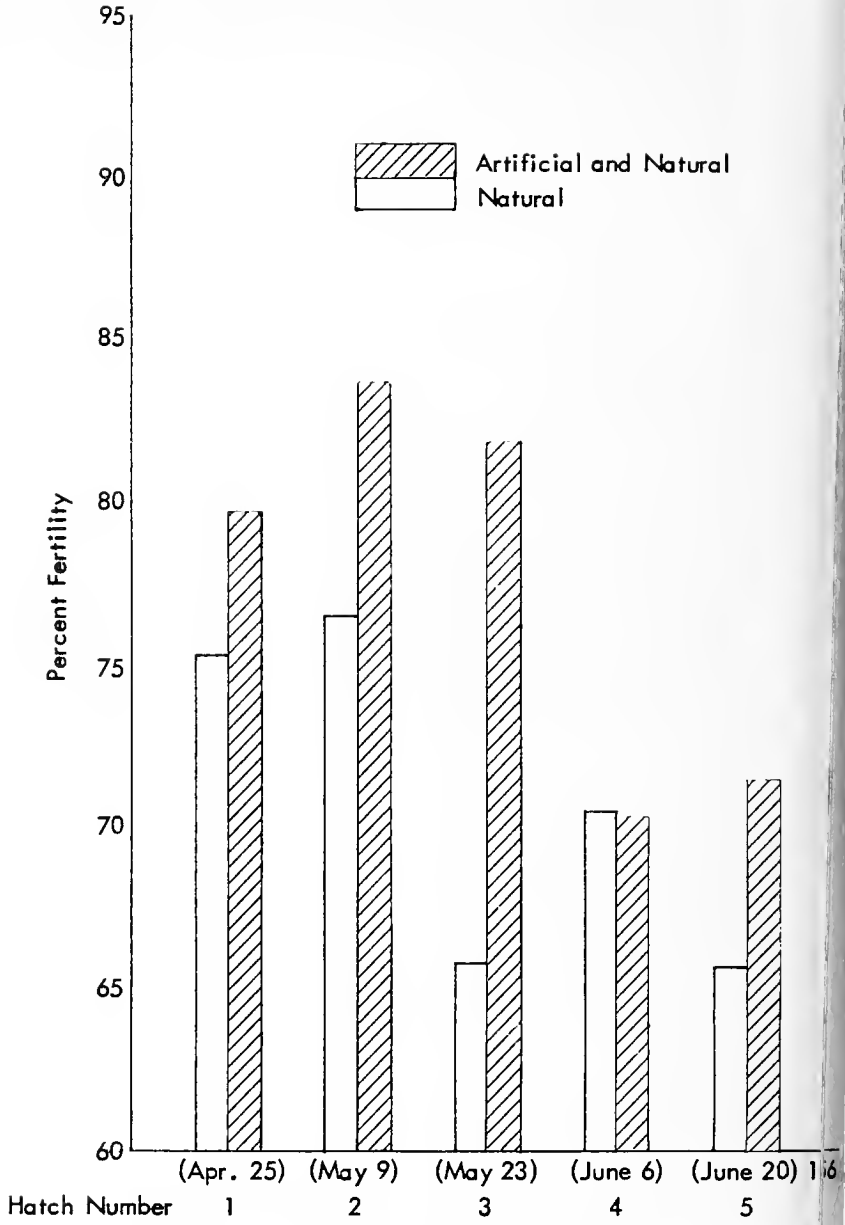
The trial was repeated in the following season in essentially th same manner as by Clark and Cook (1956) except that the semen was d luted by a diluent or extender solution.[1] The semen was diluted so tha more than twice as many hens could be inseminated as with the undilute semen each collection. The results are compared in Graph 2.

Diluted semen has usually given poor results in other experiment In this trial the results were not very good. However, the fertility

[1]A formula for an extender solution with instructions for its use will be sent to anyor upon request to the author.



GRAPH 1. Comparison of fertility from natural matings and artificial insemination.



GRAPH 2. Comparison of natural and artificial matings when an extender fluid was used.

ens artificially inseminated exceeded those naturally mated in all but he fourth hatch.

More work needs to be done to determine, if possible, the reason for he drop in fertility on the fourth hatch. It may have been poor technique. The fertility for the entire season in all groups was not too good. We ave observed that toms are inactive in wet, windy or chilly weather. It vas a very cold, wet season which seemed to affect reproduction in gen-ral, including egg production and hatchability. However, the possibili-ies look good for a satisfactory extender solution, and work is being ontinued on this problem.

After all this discussion about management of the toms and arti-icial insemination the flock owner will ask, "which is the best method or me?" The author would suggest that for the first year the owner try he supplementary method. In this manner he is not relying on either ethod entirely. It will not reduce the number of toms usually required, ut it will insure him good fertility. He will not need to inseminate every or 3 weeks. Instead it is suggested that the hens be artificially insem-nated at the start and once a month thereafter. It is essential that it be one in May when the usual drop in fertility occurs. A few extra fertile ggs will pay for the expense of inseminating.

References

Clark, T. B., and R. E. Cook. 1955. *Artificial Insemination in Broad Breasted Bronze Turkeys.* West Virginia University Agricultural Experiment Station Bulletin 382, Part 2.

Clark, T. B., and R. E. Cook. 1956. Unpublished Data. West Virginia University Agricultural Experiment Station *Annual Report.*

Marsden, S. J., and J. Holmes Martin. 1955. *Turkey Management.* Interstate Printers. Danville, Ill.

Mumford, D. Curtis. 1952. *Costs and Net Returns in Producing Turkey Hatching Eggs.* Oregon Agricultural Experiment Station Bulletin 524.

Payne, Loyal F. 1956. *Growing Turkeys in Kansas.* Kansas Agricultural Experiment Station Bulletin 376.